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41 FP with data abstraction and strong typing
John Guttag, James Horning, John Williams
October 1981 **Proceedings of the 1981 conference on Functional programming languages and computer architecture**

Full text available: 📄 pdf(1.16 MB)   Additional Information: full citation, abstract, references, citings, index terms

This paper begins by presenting arguments for including data abstraction and compile time type checking in functional programming languages, and discussing in general terms the mechanisms required to provide support for these features. It then goes on to present brief introductions to the algebraic style of formally specifying abstract data types and to the FP style of writing functional programs. The middle section describes a version of FP that includes type checking and data abstraction. ...

42 Towards an algebraic theory of recursion
Yannis E. Ioannidis, Eugene Wong
April 1991 **Journal of the ACM (JACM)**, Volume 38 Issue 2

Full text available: 📄 pdf(3.31 MB)   Additional Information: full citation, abstract, references, citings, index terms, review

An algebraic framework for the study of recursion has been developed. For immediate linear recursion, a Horn clause is represented by a relational algebra operator. It is shown that the set of all such operators forms a closed semiring. In this formalism, query answering corresponds to solving a linear equation. For the first time, the query answer is able to be expressed in an explicit algebraic form within an algebraic structure. The manipulative power thus afforded has several implicatio ...

43 Software merge: semantics of combining changes to programs
Valdis Berzins
November 1994 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 16 Issue 6

Full text available: 📄 pdf(2.07 MB)   Additional Information: full citation, abstract, references, citings, index terms, review

We present a language-independent semantic model of the process of combining changes to programs. This model extends the domains used in denotational semantics (complete partial orders) to Boolean algebras, and represents incompatible modifications as well as compatible extensions. The model is used to define the intended semantics of change-merging operations on programs and to establish some general properties of software

merging. We determine conditions under which changes to subprograms ...

Keywords: domains, semantics, software change merging, software maintenance

44 Rule-based optimization and query processing in an extensible geometric database system
Ludger Becker, Ralf Hartmut Güting
June 1992 **ACM Transactions on Database Systems (TODS)**, Volume 17 Issue 2

Full text available: pdf(3.35 MB)   Additional Information: full citation, abstract, references, citings, index terms, review

Gral is an extensible database system, based on the formal concept of a many-sorted relational algebra. Many-sorted algebra is used to define any application's query language, its query execution language, and its optimiztion rules. In this paper we describe Gral's optimization component. It provides (1) a sophisticated rule language—rules are transformations of abstract algebra expressions, (2) a general optimization framework under which more specific optimization algorithms can be ...

Keywords: extensibility, geometric query processing, many-sorted algebra, optimization, relational algebra, rule-based optimization

45 Second-order signature: a tool for specifying data models, query processing, and optimization
Ralf Hartmut Güting
June 1993 **ACM SIGMOD Record , Proceedings of the 1993 ACM SIGMOD international conference on Management of data**, Volume 22 Issue 2
Full text available: pdf(1.38 MB)   Additional Information: full citation, references, citings, index terms

Keywords: algebra, data model, extensibility, functional programming, optimization, polymorphism, query processing, signature, type system

46 Research session 2: complexity and performance evaluation: On the complexity of nonrecursive XQuery and functional query languages on complex values
Christoph Koch
June 2005 **Proceedings of the twenty-fourth ACM SIGMOD-SIGACT-SIGART symposium on Principles of database systems**
Full text available: pdf(268.53 KB)   Additional Information: full citation, abstract, references

This paper studies the complexity of evaluating functional query languages for complex values such as monad algebra and the recursion-free fragment of XQuery.We show that monad algebra with equality restricted to atomic values is complete for the class $TA[2^{o(n)}, O(n)]$ of problems solvable in linear exponential time with a linear number of alternations. The monotone fragment of monad algebra with atomic value equality but without negation is complete for nondetermi ...

47 On the Theory of Specification, Implementation, and Parametrization of Abstract Data Types
H.-D. Ehrich
January 1982 **Journal of the ACM (JACM)**, Volume 29 Issue 1
Full text available: pdf(1.12 MB)   Additional Information: full citation, references, citings, index terms

48 Towards an efficient evaluation of general queries: quantifier and disjunction processing revisited

Francois Bry

June 1989 **ACM SIGMOD Record , Proceedings of the 1989 ACM SIGMOD international conference on Management of data**, Volume 18 Issue 2

Full text available: pdf(1.63 MB)   Additional Information: full citation, abstract, references, citings, index terms

Database applications often require to evaluate queries containing quantifiers or disjunctions, e.g., for handling general integrity constraints. Existing efficient methods for processing quantifiers depart from the relational model as they rely on non-algebraic procedures. Looking at quantified query evaluation from a new angle, we propose an approach to process quantifiers that makes use of relational algebra operators only. Our approach performs in two phases. The first phase nor ...

49 Can programming be liberated from the von Neumann style?: a functional style and its algebra of programs

John Backus

August 1978 **Communications of the ACM**, Volume 21 Issue 8

Full text available: pdf(3.03 MB)   Additional Information: full citation, abstract, references, citings, index terms

Conventional programming languages are growing ever more enormous, but not stronger. Inherent defects at the most basic level cause them to be both fat and weak: their primitive word-at-a-time style of programming inherited from their common ancestor—the von Neumann computer, their close coupling of semantics to state transitions, their division of programming into a world of expressions and a world of statements, their inability to effectively use powerful combining forms for buildin ...

Keywords: algebra of programs, applicative computing systems, applicative state transition systems, combining forms, functional forms, functional programming, metacomposition, models of computing systems, program correctness, program termination, program transformation, programming languages, von Neumann computers, von Neumann languages

50 XIRQL: An XML query language based on information retrieval concepts

Norbert Fuhr, Kai Großjohann

April 2004 **ACM Transactions on Information Systems (TOIS)**, Volume 22 Issue 2

Full text available: pdf(281.91 KB)   Additional Information: full citation, abstract, references, citings, index terms

XIRQL ("circle") is an XML query language that incorporates imprecision and vagueness for both structural and content-oriented query conditions. The corresponding uncertainty is handled by a consistent probabilistic model. The core features of XIRQL are (1) document ranking based on index term weighting, (2) specificity-oriented search for retrieving the most relevant parts of documents, (3) datatypes with vague predicates for dealing with specific types of content and (4) structural vagueness f ...

Keywords: Path algebra, XML, XQuery, probabilistic retrieval, ranked retrieval, vague predicates

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Type-based analysis of uncaught exceptions

Xavier Leroy, François Pessaux
March 2000 **ACM Transactions on Programming Languages and Systems (TOPLAS)**,
   Volume 22 Issue 2

Full text available: pdf(425.96 KB)   Additional Information: full citation, abstract, references, citings, index terms

This article presents a program analysis to estimate uncaught exceptions in ML programs. This analysis relies on unification-based type inference in a nonstandard type system, using rows to approximate both the flow of escaping exceptions (a la effect systems) and the flow of result values (a la control-flow analyses). The resulting analysis is efficient and precise; in particular, arguments carried by exceptions are accurately handled.

Keywords: SML, caml, exceptions, polymorphism, rows, static debugging, type and effect systems, type inference

52 Safety and translation of calculus queries with scalar functions
Martha Escobar-Molano, Richard Hull, Dean Jacobs
August 1993 **Proceedings of the twelfth ACM SIGACT-SIGMOD-SIGART symposium on Principles of database systems**

Full text available: pdf(1.02 MB)   Additional Information: full citation, references, citings, index terms

53 Parameterized partial evaluation
Charles Consel, Siau Cheng Khoo
May 1991 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLAN 1991 conference on Programming language design and implementation**, Volume 26 Issue 6

Full text available: pdf(1.29 MB)   Additional Information: full citation, references, citings, index terms

54 Explicit substitutions and higher-order syntax
Neil Ghani, Tarmo Uustalu
August 2003 **Proceedings of the 2003 workshop on Mechanized reasoning about languages with variable binding**

Full text available: pdf(176.90 KB)   Additional Information: full citation, abstract, references, citings, index terms

Recently there has been a great deal of interest in higher-order syntax which seeks to extend standard initial algebra semantics to cover languages with variable binding by using functor categories. The canonical example studied in the literature is that of the untyped λ-calculus which is handled as an instance of the general theory of binding algebras, cf. Fiore, Plotkin, Turi [8]. Another important syntactic construction is that of explicit substitutions. The syntax of a language with e ...

Keywords: abstract syntax, algebras, explicit substitutions, monads, variable binding

55 Improvement in a lazy context: an operational theory for call-by-need
Andrew Moran, David Sands
January 1999 **Proceedings of the 26th ACM SIGPLAN-SIGACT symposium on Principles of programming languages**

Full text available: pdf(1.61 MB)   Additional Information: full citation, references, citings, index terms

56

Total correctness by local improvement in the transformation of functional programs

David Sands
March 1996 **ACM Transactions on Programming Languages and Systems (TOPLAS)**,
Volume 18 Issue 2

Full text available: pdf(513.70 KB)   Additional Information: full citation, abstract, references, citings, index terms, review

The goal of program transformation is to improve efficiency while preserving meaning. One of the best-known transformation techniques is Burstall and Darlington's unfold-fold method. Unfortunately the unfold-fold method itself guarantees neither improvement in efficiency nor total correctness. The correctness problem for unfold-fold is an instance of a strictly more general problem: transformation by locally equivalence-preserving steps does not necessarily preserve (global) equivalence. Th ...

Keywords: correctness, improvement, operational equivalence, program transformation, unfold-fold

57 ## Linguistics: semantics: Linguistic model based on the generative topological information space

Seiichi Uchinami, Yoshikazu Tezuka
September 1980 **Proceedings of the 8th conference on Computational linguistics**

Full text available: pdf(871.29 KB)   Additional Information: full citation, abstract, references

Based on the *structuralism*, we propose a generative semantic model which has a topological information space generative grammar as basic rules. In this model a semantic map which is called a topological information space, is generated by the grammar, and the space can express implications and similarities among concepts. In the syntax, a syntactic generative grammar is defined based on the space grammar, and a mapping from the map to the language is defined. The mapping is composed of two ...

58 ## Determination of the root system of semisimple Lie algebras from the Dynkin diagram

H. Schlegel
June 1991 **Proceedings of the 1991 international symposium on Symbolic and algebraic computation**

Full text available: pdf(134.45 KB)   Additional Information: full citation, index terms

59 ## Type-based analysis of uncaught exceptions

François Pessaux, Xavier Leroy
January 1999 **Proceedings of the 26th ACM SIGPLAN-SIGACT symposium on Principles of programming languages**

Full text available: pdf(1.92 MB)   Additional Information: full citation, references, citings, index terms

60 ## Unification in commutative theories, Hilbert's basis theorem, and Gröbner bases

Franz Baader
July 1993 **Journal of the ACM (JACM)**, Volume 40 Issue 3

Full text available: pdf(1.88 MB)   Additional Information: full citation, references, index terms, review

Keywords: equational reasoning

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